

A SOFT METAL CONDUCTOR AND METHOD OF MAKING

Abstract of the Disclosure

A soft metal conductor for use in a semiconductor device which has an uppermost layer consisting of grains having grain sizes sufficiently large so as to provide a substantially scratch-free surface upon polishing in a subsequent polishing step. The invention also provides a method for making a soft metal conductor that has a substantially scratch-free surface upon polishing by a multi-step deposition process, i.e., first sputtering at a higher temperature and then sputtering at a lower temperature and followed by another high temperature sputtering process. The invention further discloses a method for forming a substantially scratch-free surface on a soft metal conductor by first depositing a soft metal layer at a low deposition temperature and then annealing the soft metal layer at a higher temperature to increase the grain size of the metal. The invention also discloses a dual-step deposition method for making a soft metal conductor for use in an electronic device by first depositing a first layer of metal by a physical vapor deposition technique to a first thickness, and then depositing a second layer of metal on top of the first layer of metal to a second thickness larger than the first thickness by a method of chemical vapor deposition, electroplating or electroless plating. The first deposition process may further be conducted by a chemical vapor deposition technique, with the second deposition process conducted by a physical vapor deposition technique.